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AUTHOR McKee, John M.; Seay, Donna M.
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ABSTRACT

The adaptation and use of individually prescribed instruction (IPI) in adult basic education for the disadvantaged are discussed. The discussion describes a model IPI system (The Draper Model); recommends certain considerations if it is to be used successfully; and shows that programmed instructional (PI) materials work best in a learning system where individually prescribed and managed instruction is the goal. The basic steps employed in the use of IPI materials are described. The use of contingency management in creating a total learning environment is discussed and illustrated with an experiment in which contingency management was used in an attempt of increase the productivity of 16 prison inmates who were studying PI materials. It is concluded that IPI works, as is being shown at the Draper Correctional Center, in adult education programs, and in programs for the socioeconomically disadvantaged. Recommendations for those who are planning or operating an IPI system are provided; these are: (1) Learn the underlying theoretical principles of IPI; (2) Recognize benefits of IPI; (3) Recognize that IPI has limitations; (4) Involve the trainee in planning and operating the program; (5) Relate basic education skills as closely as possible to occupational goals and work; (6) Use small instructional units or modules; and (7) Employ paraprofessionals to assist in the training system. (DB)

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John M. McKee[1] and Donna M. Seay[2]

As currently viewed by educational leaders, Individually Prescribed Instruction (IPI) using programmed instructional materials is a practical system to solve educational problems of the disadvantaged. This system of instruction appears to be gaining recognition and an increasingly widespread use wherever education and training occur--in business and industry, public schools, mental hospitals, manpower development and training programs, and in correctional settings. This paper will focus on the adaptation and use of IPI in adult basic education for the disadvantaged. The objectives of this paper are to describe a model IPI system, to recommend certain considerations if it is to be used successfully, and to show that programmed instructional (PI) materials works best in the context of a broader learning system where individually prescribed and managed instruction is the goal.

The Draper Model

In recent years, Draper Correctional Center has experimented with developing a model basic education program in which IPI, using PI, is the primary instructional system. The staff at Draper recognized at the beginning that PI was the realistic and effective approach to individualizing basic education--a must for a population with which traditional methods had failed miserably. However, it was assumed, erroneously, in those early days that PI could markedly reduce the number of teachers and assistants required;

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[1]Director, Rehabilitation Research Foundation, Elmore, Alabama.
[2]Manpower Development and Training Supervisor of Special Services, Division of Vocational Education, State Department of Education, Montgomery, Alabama.

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that PI was so intrinsically motivating that the student could go on learning forever--captured by the inherent motivation which results from the feeling of success at every step through such long courses as English 2600 and TEMAC math. In short, staff was naive enough to think that all one had to do was to assign a PI course and the learner would do the rest.

The moment of truth came quickly. As the "Hawthorne effect" wore off, it was realized one had to get down to the business of constructing a system of learning. Attention had to be given to goals and aspirations of inmates --or instilling these through counseling and other types of interaction. The staff came to grips with the need to control distracting stimuli through the use of learning carrels and the improvement of management techniques. It became evident that a methodical diagnostic procedure was necessary for specifying knowledge deficiencies and prescribing precise remedial modular units of programs. Next, evaluation measures were developed for feedback to manager as well as to learner. Finally, it was recognized that reinforcing contingencies of learning had to be discovered and scheduled in order for learning to be efficiently maintained. Thus, a more realistic system was developed for individually prescribed instruction. The following description of the basic steps in an IPI system may be used by others who are interested in providing basic and/or remedial education programs that meet the individual needs of trainees.

Basic Steps in Individually Prescribed (IPI) Instructional System

To obtain optimum results in basic remedial education, four fundamental steps are employed in the systematic use of individually prescribed instructional materials. They are (1) diagnosis, or assessment, of learning

deficiencies, (2) prescription of the specific materials which will correct these deficiencies, (3) management of the learning activities, and (4) evaluation of the trainee's progress and the system itself. Each of these steps is described below.

Diagnosis. As a first step in this procedure, a standardized achievement test is administered. From the results of this test, an item analysis of learning difficulties and deficiencies is prepared. In most cases, further diagnostic tests must be administered to determine more specific knowledge gaps.

Prescription. After completion of the diagnostic process, a prescription schedule for the learner is prepared, providing a record of the courses or modules to be assigned and the order in which the learner will take them. To prepare the schedule, the manager must consider the information gained from the diagnostic procedure. This information will include achievement test results (overall and subtest scores including a measure of the reading level of the trainee), an item analysis of the diagnostic test, and data on goals and interests obtained during interviews with the trainee.

The manager, having selected and ordered individualized instructional materials (preferably programmed instruction) for his trainees, will be somewhat familiar with the materials from the standpoint of behavioral objectives, grade level, reading level, appropriateness for age level, and format (method of presentation). Keeping in mind the age and approximate grade level of the trainee, plus the information and insight he has obtained as to the trainee's abilities and interests, the manager weighs course objectives against learner deficiencies and selects the course

(or modules). At this point the prescription is tentative; it will very likely require adjustments at intervals.

Managing the instruction. Before the trainee begins his studies, he should have a counseling interview with the manager. At this time the manager reviews and interprets the trainee's test scores and shows him how they were used to prescribe the instructional materials he will use. The explanation should be couched in terms of the trainee's goals. The trainee's commitment is secured to his prescribed course of study. Finally, the proper use of the instructional materials is explained, and testing and grading procedures are discussed.

Each day a performance contract, covering work-expectancy, is prepared with the trainee. Work-expectancy is an approximation of what the trainee can accomplish doing steady work for a two to four-hour work period. The trainee is alerted to the fact that he will be tested at critical progress intervals within the work-expectancy period and that a passing score of 85 will net him points that may be traded in for such reinforcers as special privileges or other tangible items he might choose. The trainee should be observed closely for the first few days to note any prescription errors that need immediate correction. Supervision must be maintained to involve the trainee in his own learning process, verbal feedback, progress checks, and personal observations are all valuable tools which should be employed by the manager.

Evaluation. Evaluation is a continuous process which begins the moment the trainee comes under supervision. His progress is evaluated when his work is checked, during counseling sessions, and in all the day-to-day contacts with him. While the chief means of evaluation are his performance

contracts, there must be some formal measure of his progress within a particular course and within the entire program. Several different forms of all tests should be available.

Before a trainee is tested, he receives a spot check of his written responses to verify the fact that he has indeed worked through the material covered by the test. After the test is administered and scored, the results are immediately reviewed with him.

When a trainee is leaving the program, or at stated intervals throughout the time he is under supervision, overall progress is measured. For this purpose a different form of the standardized achievement test is administered. A comparison of results provides a measure of the trainee's overall progress. A comparison of the item analyses (pre- and post-) of learning difficulties and deficiencies can measure the effectiveness of the prescribed modules. The comparisons provide the manager with feedback about the effectiveness of the individualized instructional materials and the accuracy of the prescriptions.

Contingency Management

Much of the operation just described was arrived at empirically, but the application of behavior principles, particularly those derived from reinforcement theory, has contributed heavily to the procedure employed.

Behavior is Controlled by Its Consequences

The theoretical unperpinning of this IPI system starts out with the basic assumption that all learning takes place under specifiable conditions.

In the simplest of terms, the learner or trainee responds to a stimulus and following an appropriate response is given feedback signaling appropriateness. He may be told that his response is right, or that he did well, or any of a variety of positive consequences may follow an appropriate response. The important concept here is that his response is strengthened by what immediately follows it. Thus, a positive consequence is contingent upon an appropriate response. Contingency management is the formal administrative technique employed to provide positive consequences for all learning activities.

While the principles are simple, the effects of their systematic application have a powerful impact on motivation. Contingency management is becoming recognized by educators as necessary in creating a total learning environment. Maintaining learning behaviors at a high rate of efficiency requires the proper management of the three-fold learning contingencies--stimulus control, responses, and reinforcers.

Positive consequences of behavior are called reinforcers because they serve to strengthen or reinforce the behaviors that precede them. The learner, not the teacher or contingency manager, is the sole determiner of what reinforces him. What is a reinforcer to one student is not necessarily a reinforcer to another. There are, however, reinforcers that are effective for most students: success in learning--good grades, mastery of subject matter or skills, approval of teachers and peers. However, these reinforcers may not be effective, especially with learners who have a history of repeated failure. This does not mean that contingency management has failed. What is required at this point is a search for reinforcers for which the student will work. The search begins with the student who is the expert in what reinforces him.

High-Low Probability Behavior

This search leads to another behavior principle:

(1) Given any two behaviors, an individual has a preference for the behavior he would rather engage in at a given moment.

(2) By allowing the individual to engage first in the less preferred behavior in order to be allowed to perform the more preferred behavior, the more preferred becomes a reinforcer to the less preferred.

(3) The more the less preferred behavior is performed, paired with the reinforcing event (RE), the more preferred it becomes. It can, in turn, be used to increase the probability of lower preference behaviors.

The following is a list of some contingency management procedures frequently used:

(1) Pairing high-low probability behavior

(2) Arranging RE menu and room

(3) Contracting for performance

(4) Systematizing progress plotting

(5) Managing one's own contingencies, e.g., arranging one's own performance contract, reinforcement schedule, etc.

(6) Employing a token economy

Implications of Contingency Management for Model Development

In following the dictates of contingency management, a new learning environment will be created that will have instructional development,

learning management, and evaluation as its main activities. The traditional role of the teacher as a dispenser of information and opinion will be de-emphasized; instead, he will constantly address himself to developing and implementing the model learning system. He will continually review training objectives, learning strategies, learning events, and evaluation methods. In short, he will become the manager of an instructional system.

The learning manager will spend most of his time managing learning contingencies. He will be available to students for consultation and assistance and will spend time meeting with students individually and in small groups. He will engage in evaluation of the whole program; learners will be evaluated in relation to established criteria, not in relation to each other.

An Experiment in Contingency Management

Clements and McKee (1968) conducted an experiment using contingency management procedures patterned after Homme (1966). Contractual agreements and contingency management procedures were used in an attempt to increase the productivity of sixteen prison inmates studying programmed instruction (PI) materials. The length of the experiment was nine weeks. The amount of PI work to be done by each subject was specified daily by means of a "performance contract." Although the amount was negotiable, the conditions of the experiment required each learner to increase his performance about 20 per cent each week over a baseline measure taken during a three-week period just prior to the beginning of the study. Following completion of a unit of work, the subject was allowed a fifteen-minute period in which he could either select an item from a reinforcement menu or opt to return to the study area.

The results of the experiment showed that under conditions of contingency management, productivity, as measured by frame output, almost quadrupled. Increased amounts of work were accompanied by greater work efficiency; total time in the work area per day decreased, and the number of frames completed per hour increased. Number of tests taken doubled; per cent of tests passed increased from 71 to 80.

Conclusion and Recommendations

IPI works. It is working at Draper and is working in the adult basic education programs in many states. It is especially effective for the socio-economically disadvantaged.

But the successful users of IPI realize that it is no educational panacea. IPI does not provide the answer to all problems of the disadvantaged, but it can help materially in achieving educational objectives for the disadvantaged which traditional methods have denied him. Properly used, it can cut significantly into time required to gain knowledge and learn skills.

The following considerations may prove helpful in planning and operating an instructional system using IPI:

Learn the underlying theoretical principles of IPI, such as reinforcement learning theory, behavioral objectives, and contingency management. The theory will be needed to provide a rational base for program changes and development.

Recognize benefits of IPI. Acceptance of IPI critically affects the management of the system. Some ways of getting acceptance are through training, systematic experimentation with PI, and

group discussion. Staff must also receive reinforcement through success experience, which can be best provided by systematic use of PI.

Recognize that IPI has limitations. It is no substitute for human relationships, but it can facilitate them. A variety of group interactions is also desirable in basic education, but, even here, IPI has a contribution to make: As IPI has done, develop explicit objectives, stating in behavioral terms the things the trainee will be able to do as a result of his group experience. Then, seek to measure the outcome of the group method employed, such as discussion, role playing, and other forms of group instruction.

Involve the trainee in planning and operating the instructional program. Allow him to perform as many duties as appropriate, such as keeping his own progress charts and graphs, assisting other inmates, and orienting new trainees and visitors. Accord to the inmate the status of an adult trainee; avoid the designation student, which connotes lower status and frequently the absence of realistic goals of occupational skills and jobs.

Relate as closely as possible basic education skills to occupational goals and work. This is easy to say but quite hard to accomplish. Adult Basic Education (ABE) programs,

however, hardly exist in a vacuum: ABE only makes sense to disadvantaged groups if the skills learned are relevant to work or preparing for work. What is the relevance, for example, of First Year Algebra (TEMAC) for butchers and bricklayers and barbers? None. But an understanding of fractions for bricklayers is important for it is needed in estimating materials and surfaces and in taking measures. Serious effort must be made to relate ABE knowledges to life work. Counseling and demonstrations help, but more effective would be the ABE trainee's participation in an occupational training program where he could see the relevance unfold as he progressed through his training.

Use small instructional units or modules more than extended programs. Modules allow pinpoint prescribing for deficiencies and also allow the trainee to experience the reinforcement value of quick task completion. Maintain a constant search for other reinforcers, remembering that the principal supply source is the trainee himself.

Employ paraprofessionals, such as college students, to assist in the training system and provide them with adequate orientation and supervision. Bear in mind that with individually prescribed instruction the teacher

manages and the program teaches the subject matter. This fact permits the use of some personnel with less requirements than a college degree and teaching certificates.

An individually prescribed instructional system can be greatly improved if PI is available because PI provides the technology for individualizing instruction on the most efficient and effective basis known to date. It is not a test, not a teaching machine, not a mechanical process. It is, however, a vital component of an instructional system which is now taking its first steps toward a valid instructional technology--a much-needed development for the entire educational field, especially for the disadvantaged.

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